

Liquid Interface Diffusion Bonding of FPS Heat Pipes to Core, Phase II

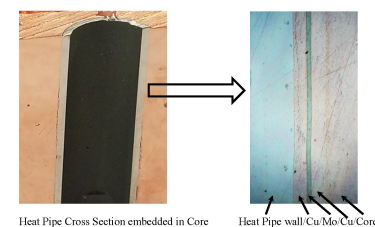
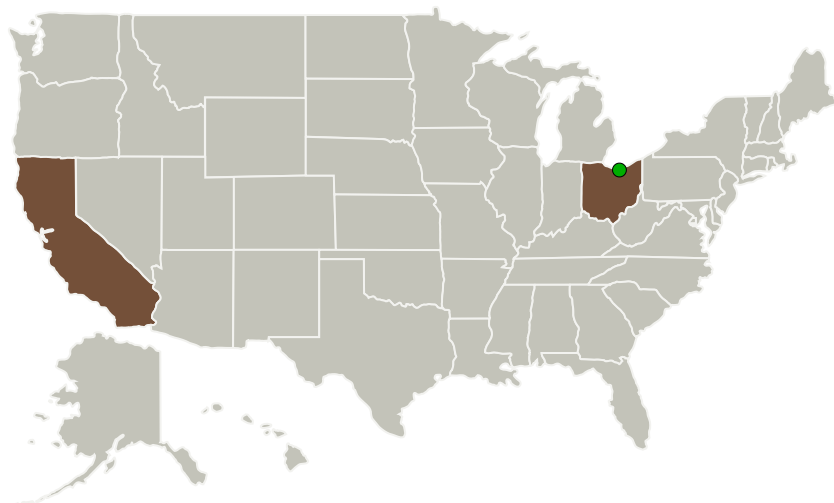


Completed Technology Project (2017 - 2019)

Project Introduction

A key challenge to producing 10kWe Fission Power Systems (FPS) is embedding and joining heat pipes internally to the U-7Mo core. A successful Phase I effort has demonstrated the feasibility of applying the technology of Liquid Interface Diffusion (LID) Bonding to embed and join heat pipes (Haynes 230) to the core. An added bonus is that this LID Bonding technology will simultaneously eliminate the seams and voids created from a core made from pieces of U-7Mo thereby providing an integrated heat pipe / U-7Mo core sub-assembly with no internal voids or separations between core pieces or from the core to the heat pipes. LID Bonding will even allow for the core to be built up by various horizontal and asymmetric pieces such as split heat pipe channels to easily receive heat pipes, consolidating the core material around the heat pipes during the LID Bonding process. Phase II will allow NASA to produce FPS up to 10 kWe and beyond to meet the power requirements for landing astronauts on Mars, and also to provide power to a host of other programs, including programs such as Neptune Systems Explorer, Kuiper Belt Optic, Trojan Tour, and Jupiter Europa Orbiter.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
The Peregrine Falcon Corporation	Lead Organization	Industry	Pleasanton, California
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

California	Ohio
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Project Transitions

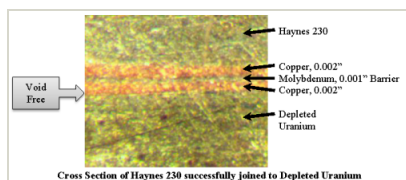
▶ **May 2017:** Project Start

✓ **November 2019:** Closed out

Closeout Documentation:

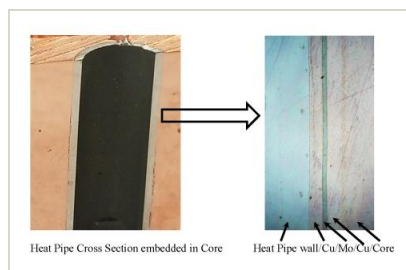
- Final Summary Chart(<https://techport.nasa.gov/file/141115>)

Images



Briefing Chart Image

Liquid Interface Diffusion Bonding of FPS Heat Pipes to Core, Phase II Briefing Chart Image (<https://techport.nasa.gov/image/134962>)



Final Summary Chart Image

Liquid Interface Diffusion Bonding of FPS Heat Pipes to Core, Phase II (<https://techport.nasa.gov/image/136922>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

The Peregrine Falcon Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

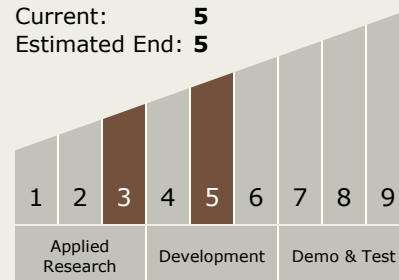
Carlos Torrez

Principal Investigator:

Robert Hardesty

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.4 Dynamic Energy Conversion

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System